**NOTICE OF FINAL RULEMAKING**
**MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS**
**REGULATION III**
**RULE 331 – SOLVENT CLEANING,**
**APPENDIX TO RULE 331**

## PREAMBLE

| 1. Sections affected | Rulemaking action |
|---|---|
| Rule 331, all sections | Amend |
| Appendix To Rule 331 | Amend |

**2. Statutory authority for the rulemaking:**

Authorizing statutes: Arizona Revised Statutes, Title 49, Chapter 3, Article 3, Sections 479 and 480 (A.R.S. § 49-479, A.R.S. § 49-480)

Implementing statute: Arizona Revised Statutes, Title 49, Chapter 1, Article 1, Section 112 (A.R.S. § 49-112)

**3. The effective date of the rules:**

Date of adoption: April 21, 2004

**4. List of all previous notices appearing in the register addressing the proposed rules:**

a. Notice of Rulemaking Docket Opening – Rule 331 and Appendix To Rule 331: Volume #9 A.A.R. Issue #43, p. 4570, October 24, 2003
b. Notice of Proposed Rulemaking – Rule 331 and Appendix To Rule 331: Volume #10 A.A.R. Issue #1, p. 31, January 2, 2004

**5. Name and address of agency personnel with whom persons may communicate regarding the rulemaking:**


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**6. An explanation of the rule, including the department's reasons for initiating the rules:**

Rule 331 (Solvent Cleaning) regulates operations using volatile organic compound (VOC)-containing solvents in non-vapor batch cleaning machines, non-vapor in-line cleaning machines,

batch-loaded vapor cleaning machines, and in-line vapor cleaning machines. Maricopa County Environmental Services Department (MCESD) adopted Rule 331 on April 7, 1999 and submitted Rule 331 to the Environmental Protection Agency (EPA) for implementation into the Arizona State Implementation Plan (SIP). In the Federal Register on April 16, 2003, EPA issued a limited approval and limited disapproval of Rule 331 as adopted on April 7, 1999. EPA identified four deficiencies in Rule 331 and directed Maricopa County to correct such deficiencies. These revisions to Rule 331 address the deficiencies.

Deficiency #1: The provisions of the rule exempt sources that are not necessarily covered by another federally approved rule. Section 102.2(a) states that Rule 331 shall not apply to sources regulated by another rule within Rules 300 through 359. Similarly, Sections 308.1(a) and 308.1(c)(1) exempt cleanup of coating-application equipment regulated by another rule in Regulation III. These exemptions do not specify that they apply only in situations where sources are in compliance with other SIP-approved rules.

To correct this deficiency, Maricopa County specified (in Sections 102.1(a), 308.1(a), and 308.1(c)(1)) that solvent cleaning operations must be subject to or specifically exempted by an EPA approved version of another rule within Regulation III of the Maricopa County Air Pollution Control Rules, in order to qualify for an exemption to Rule 331.

Deficiency #2: Subsections of the rule provide methods of determining capture efficiency but do not refer to EPA's January 9, 1995, guidance document, Guidelines for Determining Capture Efficiency, describing calculation procedures.

To correct this deficiency, Maricopa County added (in Sections 502.1(c)(2), 502.2(d), and 502.2(h)) a reference to EPA's January 9, 1995, guidance document, Guidelines for Determining Capture Efficiency.

Deficiency #3: Sections II and III of the appendix to this rule refer to solvent cleaning machines and National Emission Standards for Hazardous Air Pollutants (NESHAPS) that "are adjusted for the solvent's own boiling point". This rule does not specify which standards should be adjusted or what is meant by or how to adjust for the solvent's own boiling point. Requiring that the cleaners meet the NESHAPS as promulgated or meet the requirements of Rule 331 will correct the enforceability deficiency created by this vague language.

To correct this deficiency, Maricopa County clarified (in Sections II and III of the appendix to Rule 331) that batch vapor cleaning machines and in-line vapor cleaning machines shall not be

operated, unless such machines have a vapor/air interface Fahrenheit temperature no greater than 30% of the solvent's boiling point temperature or no greater than 40.0°F (4.4°C), whichever is lower.

Deficiency #4: Section II-6 of the appendix to Rule 331 includes additional controls for certain batch loaded vapor cleaners. The threshold for when these additional controls must be met has been raised from 10.75 ft² to 13 ft² and represents a relaxation of the rule. This deficiency can be corrected by lowering the threshold to 10.75 ft². Or this deficiency can be corrected by demonstrating that this relaxation represents less than 5% deviation from Reasonably Available Control Technology (RACT), as discussed in the EPA's Guidance Document For Correcting Common VOC & Other Rule Deficiencies, and is consistent with Clean Air Act (CAA) section 110(l).

To correct this deficiency, Maricopa County lowered the threshold to 10.75 ft² in Section II of the appendix to Rule 331.

Other revisions to Rule 331 and to the Appendix To Rule 331 have been made in order to improve clarity and to fix typographical and formatting errors, so as to increase rule enforceability.

**7. Demonstration of compliance with A.R.S. § 49-112:**

Under A.R.S. § 49-479(c), a county may not adopt a rule that is more stringent than the rules adopted by the director of the Arizona Department of Environmental Quality (ADEQ) for similar sources unless it demonstrates compliance with the requirements of A.R.S. § 49-112. Under that statute:

> When authorized by law, a county may adopt a rule, ordinance, or other regulation that is more stringent than or in addition to a provision of this title or rule adopted by the director or any board or commission authorized to adopt rules pursuant to this title if all the following conditions are met:
>
> 1. The rule, ordinance or other regulation is necessary to address a peculiar local condition;
> 2. There is credible evidence that the rule, ordinance or other regulation is either:
>    (a) Necessary to prevent a significant threat to public health or the environment that results from a peculiar local condition and is technically and economically feasible

(b) Required under a federal statute or regulation, or authorized pursuant to an intergovernmental agreement with the federal government to enforce federal statutes or regulations if the county rule, ordinance or other regulation is equivalent to federal statutes or regulations.

A.R.S. § 49-112 (A).

Maricopa County revised Rule 331 and the Appendix To Rule 331 in order to address a peculiar local condition: the designation of Maricopa County as a serious nonattainment area for ozone. Maricopa County is the only ozone nonattainment area in Arizona; consequently stronger regulations must be adopted in this area to address a serious health threat. Because of this, the revisions comply with A.R.S. § 49-112 (A)(1). Additionally the Clean Air Act section 172(b) requires that ozone nonattainment areas implement reasonable available control technology (RACT) for source categories subject to a control techniques guideline. Solvent cleaning is subject to a control techniques guideline. Because Rule 331 is part of the Arizona SIP for the control of VOCs, the regulation is federally enforceable. Therefore the revisions have been made pursuant to A.R.S. § 49-112 (2).

**8. A reference to any study relevant to the rule that the agency reviewed and either proposes to rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:**

None.

**9. Summary of the economic, small business, and consumer impact:**

**Economic Impacts On Regulated Sources:**

The revisions to Rule 331 and to the Appendix To Rule 331 are administrative in nature and will not raise costs for compliance with nor enforcement of this rule. Although Maricopa County lowered the threshold triggering additional conditions for certain batch loaded vapor cleaners to 10.75 ft², there are no batch loaded vapor cleaners in Maricopa County with a surface area of 10.75 ft². The batch loaded vapor cleaners in Maricopa County have a surface area of 13 ft² or larger and are already subject to Rule 331. Lowering the threshold to 10.75 ft² will not require sources that are not currently subject to Rule 331 to now comply with Rule 331. Collectively, all of the revisions to Rule 331 and to the Appendix To Rule 331 will allow the rule to fully meet RACT and the requirements of section 110(a) and part D of the CAA as amended in 1990.

**Economic Impacts On County Resources:**

Maricopa County Environmental Services Department, Air Quality Division, has compliance and enforcement programs to handle VOC emissions from solvent cleaning. There should be no additional costs to Maricopa County.

**Health Costs:**

Because Maricopa County is a serious nonattainment area for ozone, which these revisions address, it is imperative to consider the medical and social costs of failing to take steps toward the improvement of the air quality. Adverse health effects from air pollution result in a number of economic and social consequences, including:

1. Medical Costs - Personal out-of-pocket expenses of the affected individual (or family), plus costs paid by insurance or Medicare, for example.
2. Work loss – Lost personal income, plus lost productivity whether the individual is compensated for the time or not. For example, some individuals may perceive no income loss because they receive sick pay, but sick pay is a cost of business and reflects lost productivity.
3. Increased Costs For Chores And Caregiving – Special caregiving and services that are not reflected in medical costs. These costs may occur, because some health effects reduce the affected individual's ability to undertake some or all normal chores. The affected individual may require extra care.
4. Other Social And Economic Costs – Restrictions on or reduced enjoyment of leisure activities, increased discomfort or inconvenience, increased pain and suffering, anxiety about the future, and concern and inconvenience to family members.

**Rule Impact Reduction On Small Businesses:**

A.R.S. § 41-1055 requires Maricopa County to reduce the impact on small businesses by using certain methods when they are legal and feasible in meeting the statutory objectives of the rulemaking. A small business is defined in A.R.S. § 41-1001 as a "concern, including its affiliates, which is independently owned and operated, which is not dominant in its field and which employs fewer than one hundred full-time employees or which had gross annual receipts of less than four million dollars in its last fiscal year. For purposes of a specific rule, an agency may define small business to include more persons if it finds that such a definition is necessary to adapt the rule to the needs and problems of small businesses and organizations." Maricopa County solicits input from stakeholders (i.e., small businesses) regarding administrative costs associated with compliance with proposed rulemakings and any other information relevant to the economics, small business, and consumer impact statement. Because of the nature of the revisions to Rule 331 and to the Appendix To Rule 331, small businesses will be affected only minimally.

**Conclusion:**

Because the changes to Rule 331 and to the Appendix To Rule 331 essentially clarify requirements that already exist, there is only a minimal economic impact on regulated entities, county resources, small businesses, and the public at large.

**10. Description of the changes between the proposed rules, including supplemental notices, and final rules:**

The following changes were made in Rule 331 and Appendix To Rule 331, since the text of the proposed rule was published in the Notice Of Proposed Rulemaking on January 2, 2004. These changes appear in the text of the final rules to be published in this Notice Of Final Rulemaking.

Section 303.1(f)(1): Deleted "Do not clean porous or absorbent materials, including, but not limited to, cloth, leather, wood, and rope, in a cleaning machine" and added "Do not clean nor use porous or absorbent materials to clean parts or products in a cleaning machine. For the purpose of this rule, porous or absorbent materials include, but are not limited to, cloth, leather, wood, and rope".

Section 303.1(f)(3): Added "Do not place porous or absorbent materials, including, but not limited to, cloth, leather, wood, and rope on a cleaning machine".

Section 303.1(j): Changed "i.e." to "e.g." and changed the context from plural to singular.

Section 303.1(j)(3): Deleted "the filtration device shall be disposed-of in accordance with appropriate waste disposal regulations" and added "the filtration device shall be stored in a closed, leakfree, impervious container that is legibly labeled with its contents and that remains covered when not in use. Disposal of the filtration device shall be done in a manner that inhibits VOC evaporation and that is in compliance with appropriate/legal methods of disposal".

Section 305.3(a)(1): Added "; or" to the end of the sentence.

**11. Summary of the comments made regarding the rules and the department's response to them:**

Maricopa County Environmental Services Department, Air Quality Division received written comments from 2 stakeholders regarding the revisions to Rule 331 and Appendix To Rule 331.

**Comment #1**

Non-precursor organic compounds are defined in the draft rule and are designated as "exempt" by EPA. In order to clarify that these compounds are exempt, a line should be added to Section 102.2 that states: "This rule is not applicable to: e. Solvent cleaning operations that utilize non-precursor organic compounds".

**Response #1**

Rule 331 is not applicable to non-precursor organic compounds. The applicability statement in Section 102 states that Rule 331 is applicable to VOC-containing solvents. Non-precursor organic compounds are not VOCs and therefore non-precursor organic compounds are not regulated by Rule 331.

**Comment #2**

Section 303.1(f)(1) creates some confusion with the wording "Do not clean…". We understand that "clean" was used to address the issue of porous filtration devices that are inherent in the design of some cleaning machines. However, "clean" would allow for the placement of porous or absorbent materials in or on the cleaning machine. We don't believe that this is Maricopa County's intent. We suggest that the wording be modified to address this issue.

**Response #2**

To address the confusion regarding placing porous or absorbent materials in or on a cleaning machine, Maricopa County deleted "Do not clean porous or absorbent materials, including, but not limited to, cloth, leather, wood, and rope, in a cleaning machine" and added "Do not clean nor use porous or absorbent materials to clean parts or products in a cleaning machine. For the purpose of this rule, porous or absorbent materials include, but are not limited to, cloth, leather, wood, and rope".

**Comment #3**

Section 303.1(f)(2) specifically disallows wood handled objects from use in or on a cleaning machine. Does this then allow all plastic handled brushes to be used? We would request that clarification on the use of these brushes be provided.

**Response #3**

Plastic and/or metal handled brushes can be used in or on a cleaning machine.

**Comment #4**

Section 303.1(j)(3), regarding filtration devices, includes a reference to waste disposal regulations. Because Maricopa County does not regulate waste disposal, this reference is inappropriate and should be removed.

**Response #4**

Maricopa County deleted the reference to waste disposal regulations in Section 303.1(j)(3) and added the following text: "The filtration device shall be stored in a closed, leakfree, impervious container that is legibly labeled with its contents and that remains covered when not in use. Disposal of the filtration device shall be done in a manner that inhibits VOC evaporation, such as, but not limited to, having the filtration device hauled off-site in a sealed container".

**12. Any other matters prescribed by the statute that are applicable to the specific department or to any specific rule or class of rules:**

None

**13. Incorporations by reference and their location in the rules:**

| Incorporation By Reference | Location |
|---|---|
| EPA Methods 2, 2a, 2c, and 2d | Rule 331, Section 502.2(a) |
| EPA Method 18 | Rule 331, Section 502.2(b) |
| EPA Methods 25, 25a, and 25b | Rule 331, Section 502.2(c) |
| EPA Test Methods 204, 204a, 204b, 204c, 204d, 204e, and 204f | Rule 331, Section 502.2(d) |
| California's Bay Area Air Quality Management District Method 31 | Rule 331, Section 502.2(e) |
| California's South Coast Air Quality Management District Method 313-91 | Rule 331, Section 502.2(f) |
| ASTM Method D2879-96 | Rule 331, Section 502.2(g) |
| EPA Guidance Document, "Guidelines For Determining Capture Efficiency" | Rule 331, Section 502.2(h) |

**14. Was this rule previously an emergency rule?**

No

**15. The full text of the rules follows:**

Rule 331 and Appendix To Rule 331

**REGULATION III - CONTROL OF AIR CONTAMINANTS**

**RULE 331**

**SOLVENT CLEANING**

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**Revised 07/13/88**

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**MARICOPA COUNTY**

**AIR POLLUTION CONTROL REGULATIONS**

**REGULATION III - CONTROL OF AIR CONTAMINANTS**

**RULE 331**

**SOLVENT CLEANING**

**SECTION 100 - GENERAL**

**101 PURPOSE:** No change.

**102 APPLICABILITY:** This rule is applicable to operations using VOC-containing solvents to remove impurities from exterior or interior surfaces. Compliance with the provisions of this rule shall not relieve any person subject to the requirements of this rule from complying with any other federally enforceable requirements. In such case, the more stringent requirement shall apply. In any instance where more than one of the requirements set forth in this rule may be applicable, the most restrictive requirement shall apply.

**102.1** Solvents regulated by this rule may also be regulated by New Source Performance Standards (NSPS)~~,~~ in Rule 360 of these rules and/or National Emission Standards for Hazardous Air Pollutants (NESHAPs)~~,~~ in Rule 370 of these rules.

**102.2** This rule is not applicable to:

**a.** ~~Solvent cleaning operations specifically regulated by another rule within Rules 300 through 359 (See subection 308.1).~~ A solvent cleaning operation that is subject to or specifically exempted by an EPA approved version of another rule within Regulation III of these rules.

**b.** ~~Laundering and housekeeping supplies and activities.~~ Janitorial cleaning.

**c.** Testing for surface cleanliness or the cleaning of laboratory equipment at the laboratory.

**d.** A cleaning-solvent ~~solution containing 2.0% or less VOC (by either weight or volume), or equivalent, as shown by~~ that meets any of the following:

**(1)** Is composed of at least 98% water by either weight or volume; or

**(2)** Contains only water and material which is a dry solid before mixing with water; or

**(3)** Has a VOC content not exceeding 20 grams per liter (0.17 lb/gal).

**102.3** Partial or conditional exemptions from this rule are set forth in ~~subections 308.2, 308.3, and 308.4~~ Section 308 of this rule.

**SECTION 200 – DEFINITIONS:** See Rule 100 (General Provisions And Definitions) of these rules for definitions of terms that are used but not specifically defined in this rule. For the purpose of this rule, the following definitions shall apply:

**201** **AGITATION, AGITATED –** No change.

**202** **BATCH CLEANING MACHINE –** No change.

**203** **BLASTING/MISTING WITH SOLVENT –** No change.

**204** **CABINET STYLE CLEANING MACHINES –** No change.

**205** **CARRY-OUT –** No change.

**206** **CLEANING-SOLVENT –** No change.

**207** **CONFORMING SOLVENT -** A cleaning-solvent ~~that has~~ having a total VOC vapor pressure ~~conforming to the limits in Table 1 (subsection 304.1). On November 1, 2001, and thereafter, the limit is 1 mm Hg at 20°C (68°F).~~ at 68°F (20°C) not exceeding 1 millimeter of mercury column.

**208** **DEGREASER –** No change.

**209** **DRY SOLID -** Any substance that appears and feels dry. ~~and that shatters or pulverizes when struck with a hard object.~~ Evaporating solids, all of which have a strong odor, are not included.

**210** **EMISSION CONTROL SYSTEM (ECS) -** A system ~~approved in writing by the Control Officer, designed and operated in accordance with good engineering practice to reduce emissions of volatile organic compounds. Such system consists of an emissions collection subsystem and an emissions processing subsystem.~~ for reducing emissions of volatile organic compounds, consisting of both a capture system and control device(s).

**211** **FLUSHING WITH SOLVENT -** Introducing cleaning-solvent directly into the internal space(s) of an object or assembly using a hose or pipe. Rinsing the outside of an object or assembly and swishing an object or assembly in cleaning-solvent are not considered flushing with solvent. Such activities must comply with Section 303.1 of this rule.

**212** **FREEBOARD HEIGHT –** No change.

**213** **FREEBOARD RATIO** – ~~The freeboard height divided by the smaller of the inside horizontal length or the inside horizontal width of the evaporative surface area within the cleaning machine (degreaser).~~ The ratio of the solvent cleaning machine freeboard height to the smaller interior dimension (length, width, or diameter) of the solvent cleaning machine.

**214** **HEATED SOLVENT -** Any cleaning-solvent which is heated by a device to a temperature exceeding 120°F ~~(38°C)~~ (49°C).

**215** **IMPERVIOUS –** No change.

**216** **IN-LINE CLEANING MACHINE (CONTINUOUS CLEANING MACHINE) –** No change.

**217** **JANITORIAL CLEANING –** The cleaning of building or facility components to keep work areas in clean condition. Building or facility components include, but are not limited to, floors, ceilings, walls, windows, doors, stairs, bathrooms, furnishings, textiles, wash rags, uniforms, and exterior surfaces of office equipment.

~~217~~ **218** **LEAK –** The state or condition in which a cleaning-solvent, excluding a Low-VOC Cleaner, is allowed to seep or drip, or otherwise enters or escapes, at either of the following rate or magnitude:

~~217.1~~ **218.1** Three or more drops of liquid cleaning-solvent per minute; or

~~217.2~~ **218.2** Any puddle of cleaning-solvent greater than 1 square inch.

~~218~~ **219** **LOW-VOC CLEANER -** Any solution or homogeneous suspension that, as used, contains less than 50 grams of VOC per liter of material (0.42 lb VOC/gal) or is at least 95% water by weight or volume as determined by an applicable test method in Section 502 of this rule. ~~Within Section 300 and Section 500 of this rule, a Low-VOC Cleaner is subject only to Section 301, Section 302, subsection 307.1, subsection 501.1(a), and subsection 501.2.~~

~~219~~ **220** **MAKE-UP SOLVENT -** ~~The increment of~~ A cleaning-solvent that replaces solvent lost through evaporation or other means, and that is added to the solvent remaining in a cleaning machine (degreaser) to bring solvent quantity to the desired level.

~~220~~ **221** **MATERIAL VOC CONTENT –** See VOC CONTENT OF MATERIAL.

~~221~~ **222** **NON-CONFORMING SOLVENT -** A cleaning-solvent ~~that has~~ having a total VOC vapor pressure ~~which exceeds the limits in Table 1 (subsection 304.1) but is legal to use in operations to which this rule applies, because at least one of the following subsections applies to the solvent cleaning operation in which the solvent is used:~~ at 68°F (20°C) exceeding 1 millimeter of mercury column.

~~221.1 The emissions from the operation are controlled by an ECS per subsection 304.2 or by a Sealed System per subsection 304.3; or~~

~~221.2 The operation is exempted by subsection 308.2; or~~

~~221.3 The operation is both exempted by subsection 308.3 and complies with subsection 305.3, or for in-line machines, complies with all of Section 306 except subsection 306.4.~~

~~222~~ **223** **NON-PRECURSOR ORGANIC COMPOUND –** Any of the organic compounds which have been designated by the EPA as having negligible photochemical reactivity. EPA designates such compounds as "exempt". A listing of the compounds is found in Rule 100.

~~223~~ **224** **ORGANIC COMPOUND –** Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

~~224~~ **225** **REFRIGERATED FREEBOARD CHILLER –** A control device which is mounted above any cooling-water jacket or primary condenser coils, consisting of secondary coils which carry a refrigerant to provide a chilled air blanket above the solvent vapor/air interface to reduce emissions from the cleaning machine (degreaser) bath.

~~225~~ **226** **REMOTE RESERVOIR CLEANING MACHINE (DEGREASER) -** Any non-vapor cleaning machine (degreaser) in which the reservoir for storing the cleaning-solvent is completely separated by impervious surfaces from the sink or basin where cleaning is performed, except for a connecting tube ~~or isthmus~~ through which solvent returns to the reservoir when cleaning is stopped.

~~226~~ **227** **SEALED SYSTEM -** An Air-tight or Airless Cleaning System that is operated and equipped pursuant to ~~subection~~ Section 304.3 of this rule.

~~227~~ **228** **SOLVENT –** For the purpose of this rule, any liquid or vapor which is used to dissolve, clean, strip, or remove impurities, coatings, contaminants, or films from surfaces or from internal spaces and voids. In addition to VOC-containing solvents, this also includes plain water and mixtures containing water.

~~228~~ **229** **SOLVENT CLEANING MACHINE (CLEANING MACHINE) (DEGREASER) -** Any liquid container and ancillary equipment designed to clean surfaces and/or remove surface contaminants using cleaning-solvents.

~~229~~ **230** **SOLVENT/AIR INTERFACE –**

~~229.1~~ **230.1** **Non-Vapor Cleaner:** The location of contact between the liquid solvent and the air.

~~229.2~~ **230.2** **Vapor Cleaner:** The location of contact between the concentrated layer of solvent vapor and the air.

~~230~~ **231** **SOLVENT/AIR INTERFACE AREA –**

~~230.1~~ **231.1** **Non-Vapor Cleaner:**

- **a.** **With Included/Integral Reservoir:** The surface area of liquid cleaning-solvent that is exposed to the air.
- **b.** **With Remote Reservoir:** The surface area of the solvent sink or work area.

**231.2** **Vapor Cleaner:** The area of the horizontal plane that is located halfway between the highest and lowest points of the primary condenser coils and which contacts the interior walls of the cleaning machine.

~~231~~ **232** **TOTAL VOC VAPOR PRESSURE (VOC COMPOSITE PARTIAL PRESSURE) -** Within a solution or homogenous mixture, it is the sum of the partial pressures of all those components that are defined as VOCs, calculated according to the formula in ~~subsection 502.4~~ Section 502.3 of this rule.

~~232~~ **233** **VAPOR CLEANING MACHINE -** Any cleaning machine in which solvent-vapor from boiling cleaning solvent is utilized for cleaning object

~~233~~ **234** **VOC CONTENT OF MATERIAL(MATERIAL VOC CONTENT) -**

$$\text{VOC CONTENT OF MATERIAL as a percent} = \frac{W_s - W_w - W_{es}}{W_m} \text{ X } 100\%$$

Using consistently either pounds or grams in the calculations:

Where: $W_s$ = weight of volatile material in pounds (or grams), including water, non-precursor organic compounds, and dissolved vapors.

$W_w$ = weight of water in pounds (or grams)

$W_{es}$ = total weight of non-precursor organic compounds in pounds(or grams)

$W_m$ = weight of total material in pounds(or grams)

$$\text{VOC CONTENT OF MATERIAL in pounds per gallon (g/l)} = \frac{W_s - W_w - W_{es}}{V_m}$$

Using consistently either English or metric measures in the calculations

Where: $W_s$ = weight of all volatile material in pounds (or grams) including VOC, water, non-precursor organic compounds and dissolved vapors.

$W_w$ = weight of water in pounds (or grams)

$W_{es}$ = weight of all non-precursor compounds in pounds (or grams)

$V_m$ = volume of total material in gallons (or liters)

~~234~~ **235** **VOLATILE ORGANIC COMPOUND (VOC) -** Any organic compound which participates in atmospheric photochemical reactions, except non-precursor organic compounds.

~~235~~ **236** **WIPE CLEANING -** That method of ~~cleaning which utilizes a material such as a rag wetted with solvent, coupled with a physical rubbing process, including automated rubbing, to remove contaminants from surfaces.~~ removing contaminants from a surface by physically rubbing or automatically rubbing with a porous or absorbent material, such as a rag, paper, sponge, or cotton swab, moistened with a solvent.

**SECTION 300 - STANDARDS**

**301** **SOLVENT HANDLING REQUIREMENTS:** Any person to whom this rule applies must comply with all of the following:

**301.1** All cleaning-solvent, including solvent soaked materials, shall be kept in closed, leakfree, impervious containers that are opened only when adding or removing material.

**a.** ~~Rags~~ Porous or absorbent materials used for wipe cleaning shall be stored in closed containers when not in use.

**b.** Each container shall be clearly labeled with its contents.

**301.2** No change.

**301.3** No change.

**302 EQUIPMENT REQUIREMENTS FOR ALL CLEANING MACHINES:** Any person operating a cleaning machine to which this rule applies must comply with all of the following:

**302.1** Provide a leakfree, impervious container (degreaser) for the solvents and the articles being cleaned.

**a.** The VOC-containment portion shall be impervious to VOC-containing liquid and vapors.

**b.** No surface of any freeboard required by this rule shall have an opening or duct through which VOC can escape to the atmosphere, except as controlled by an ECS, or as required by OSHA.

**302.2** No change.

**303 SPECIFIC OPERATING & SIGNAGE REQUIREMENTS FOR CLEANING MACHINES:** Any person who cleans with cleaning-solvent other than a Low-VOC Cleaner must conform to all of the following operating requirements:

**303.1 Operating Requirements:**

**a.** **Fans:** ~~Comfort fans shall not be used near cleaning machines.~~ Do not locate nor position comfort fans in such a way as to direct airflow across the opening of any cleaning machine.

**b.** **Cover:** Do not remove any device designed to cover the solvent unless processing work in the cleaning machine or maintaining the machine.

**c.** **Draining:** Drain cleaned parts for at least 15 seconds after cleaning or until dripping ceases, whichever is later.

**d.** **Spraying:** If using a cleaning-solvent spray system,

**(1)** Use only a continuous, undivided stream (not a fine, atomized, or shower type spray).

**(2)** Pressure at the orifice from which the solvent emerges shall not exceed 10 psig and shall not cause liquid solvent to splash outside of the solvent container.

**(3)** In an in-line cleaning machine, a shower-type spray is allowed, provided that the spraying is conducted in a totally confined space that is separated from the environment.

**(4)** Exceptions to foregoing ~~subsections~~ Sections 303.1d(1), (2), and (3) are provided for in Section 307 of this rule.

**e. Agitation:** No person shall cause agitation of a cleaning-solvent in a cleaning machine by sparging with air or other gas. Covers shall be placed over ultrasonic cleaners when the cleaning cycle exceeds 15 seconds.

**f. No Porous Material:** ~~Do not place porous or absorbent materials in or on a cleaning machine. This includes, but is not limited to, cloth, leather, wood and rope. No object with a sealed wood handle, including a brush, is allowed after 1999.~~

**(1)** Do not clean nor use porous or absorbent materials to clean parts or products in a cleaning machine. For the purpose of this rule, porous or absorbent materials include, but are not limited to, cloth, leather, wood, and rope.

**(2)** Do not place an object with a sealed wood handle, including a brush, in or on a cleaning machine.

**(3)** Do not place porous or absorbent materials, including, but not limited to, cloth, leather, wood, and rope on a cleaning machine.

**g. Vent Rates:** The ventilation rate at the cleaning machine shall not exceed 65 cfm per square foot of evaporative surface (20 $m^3$/min./$m^2$), unless that rate must be changed to meet a standard specified and certified by a Certified Safety Professional, a Certified Industrial Hygienist, or a licensed professional engineer experienced in ventilation, to meet health and safety requirements.

**h. Hoist Speed:** Limit the vertical speed of mechanical hoists moving parts in and out of the cleaning machine to a maximum of 2.2 inches per second and 11 ft/min. (3.3 m/min.).

**i. Contamination Prevention:** Prevent cross contamination of solvents regulated by Section 304 of this rule with solvents that are not so regulated. Use signs, separated work-areas, or other effective means for this purpose. This includes those spray gun cleaning solvents that are regulated by another rule of these ~~Rules and Regulations~~ rules.

**j.** **Filtration Devices:** If a filtration device (e.g., to remove oils, greases, sludge, and fine carbon from cleaning solvent) is inherent in the design of the cleaning machine, then such filtration device shall be operated in accordance with manufacturer's specifications and in accordance with the following requirements:

**(1)** The filtration device shall be fully submerged in cleaning solvent at all times during filtration.

**(2)** When the filtration device is completely saturated and must be removed from the cleaning machine, the filtration device shall be drained until no liquid can flow from the filtration device. Draining and drying such filtration device shall be conducted in a sealed container with no exhaust to the atmosphere or work area.

**(3)** After the filtration device is dry, the filtration device shall be stored in a closed, leakfree, impervious container that is legibly labeled with its contents and that remains covered when not in use. Disposal of the filtration device shall be done in a manner that inhibits VOC evaporation and that is in compliance with appropriate/legal methods of disposal.

**303.2 Signage Requirements:** No change.

**304 SOLVENT SPECIFICATIONS FOR NON-VAPOR CLEANING AND DEGREASING:** [Operating requirements specifically for vapor cleaning machines are in the Appendix.] All cleaning solvents, except Low-VOC Cleaners, used in non-boiling cleaning machines shall comply with ~~subsection~~ Section 304.1 or ~~subsection~~ Section 304.2 or ~~subsection~~ Section 304.3, as follows:

**304.1** Use a cleaning-solvent having a total VOC vapor pressure at 68°F (20°C) not exceeding ~~the limits in Table 1:~~ 1 millimeter of mercury column, as determined by the standards described in Section 500 of this rule.

~~**TABLE 1**~~

| ~~**Limit: Maximum Total VOC Vapor Pressure**~~ | ~~**Time Period Limit is in Effect**~~ |
|---|---|
| ~~2 millimeters of mercury column~~ | ~~From November 1, 1999 through October 31, 2001~~ |
| ~~1 millimeter of mercury column~~ | ~~From November 1, 2001 and thereafter.~~ |

**304.2 ECS:** Use an ECS to capture and process VOC emissions in accordance with ~~subsection~~ Section IV of the Appendix within this rule; or

**304.3 Sealed System:** No change.

**305 NON-VAPOR BATCH CLEANING MACHINES:** Equipment requirements for non-vapor batch cleaning machines with remote reservoirs are set forth in ~~subsection~~ Section 305.1 of this rule. Equipment standards applicable to non-vapor batch cleaning machines with internal reservoirs (non-remote) are set forth in ~~subsection~~ Section 305.2 of this rule. Non-vapor batch cleaning machines with either remote or internal reservoirs that use cleaning-solvents that are either heated, agitated or non-conforming are subject to additional provisions set forth in ~~subsection~~ Section 305.3 of this rule. Low-VOC Cleaners are exempt from this section.

**305.1 With Remote Reservoir:** No change.

**305.2 ~~Cleaning Machine~~ With Internal Reservoir (Non-Remote):** A batch cleaning machine without a remote reservoir shall be equipped with all of the following:

**a.** Have and use an internal drainage rack or other assembly that confines within the freeboard all cleaning-solvent dripping from parts and returns it to the hold of the cleaning machine (degreaser); and

**b.** Have an impervious cover which when closed prevents cleaning-solvent vapors in the cleaning machine from escaping into the air/atmosphere when not processing work in the cleaning machine.

**(1)** A cover shall be fitted so that in its closed position the cover is between the cleaning-solvent and any lip exhaust or other safety vent, except that such position of cover and venting may be altered by an operator for valid concerns of flammability established in writing and certified to by a Certified Safety Professional or a Certified Industrial Hygienist to meet health and safety requirements.

**(2)** A cover is not required when an ECS is used in accordance with ~~subsection~~ Section IV of the Appendix within this rule.

**c.** In the absence of additional applicable freeboard standards, freeboard height shall be not less than 6 inches (15.2 cm); and

**d.** The freeboard zone shall have a permanent, conspicuous mark that locates the maximum allowable solvent level which conforms to the applicable freeboard requirements.

**305.3 Using Cleaning-Solvent That Is Heated, Agitated, Or Is Non-Conforming:** If a cleaning machine uses a cleaning-solvent at a temperature above 120°F (49°C), uses non-conforming solvent if allowed by Section 305.3(d) of this rule, or agitates the solvent, then comply with one of the following:

**a.** **Remote Reservoir Cleaning Machines:** For a remote reservoir cleaning machine, comply with ~~subsection~~ Section 305.1 of this rule and~~, in addition, use a stopper in the drain or a cover covering the sink whenever the sink or cabinet is empty of solvent and nothing is being handled in the sink.~~ one of the following:

**(1)** Use a stopper in the drain whenever the sink or cabinet is empty of solvent and nothing is being handled in the sink; or

**(2)** Cover the sink or cabinet whenever the sink or cabinet is empty of solvent and nothing is being handled in the sink.

**b.** ~~Cleaning Machines With~~ **Internal Reservoir Cleaning Machines:** ~~A person using a cleaning machine that has~~ For an internal reservoir cleaning machine, ~~shall~~ comply with ~~subsection~~ Section 305.2 of this rule and either ~~subsection~~ Section (1) or (2) that follow:

**(1)** **A Water Cover:** A floating layer of water (insoluble in the solvent) at least 1 inch thick, and a freeboard at least 6 inches above the top of the solvent shall be present; or

**(2)** **Freeboard And Cover:**

**(a)** The basin shall have a freeboard ratio of 0.75 or greater and an impervious cover shall cover the basin whenever work is not being processed; and

**(b)** If a non-conforming solvent is used, the cover shall be of a sliding or rolling type which is designed to easily open and close in a horizontal plane without disturbing the vapor zone.

**c.** **Cabinet Style:** Keep a cabinet-style cleaning machine closed at all times that it contains cleaning-solvent, except when introducing or removing work from the machine. If blasting or misting with cleaning-solvent, also conform to the applicable requirements of Section 307 of this rule.

**d.** **Non-Conforming Solvent:** A non-conforming solvent may be used in operations to which this rule applies, if at least one of the following is met:

**(1)** The emissions from the operation shall be controlled by an ECS per Section 304.2 of this rule or by a Sealed System per Section 304.3 of this rule; or

**(2)** The operation is exempted per Section 308.2 of this rule; or

**(3)** The operation is both exempted per Section 308.3 of this rule and complies with Section 305.3 of this rule, or for in-line machines, complies with all of Section 306 of this rule except Section 306.4 of this rule.

**305.4 ECS Alternative:** An owner and/or operator is allowed to meet the requirements of any one or combination of the requirements of ~~subsections~~ Sections 305.1, 305.2 and/or 305.3 of this rule by operating an ECS in accordance with ~~subsection~~ Section IV of the Appendix within this rule whenever any requirement of ~~subsections~~ Sections 305.1, 305.2 and/or 305.3 of this rule is not met.

**306 NON-VAPOR IN-LINE CLEANING MACHINES:** No person shall operate ~~an in-line non-vapor~~ a non-vapor in-line cleaning machine using cleaning-solvent unless it complies with ~~subsections~~ Sections 306.1, 306.2, and 306.3 of this rule:

**306.1 Features:** No change.

**306.2 Minimized Openings:** Entrances and exits should silhouette workloads so that the average clearance between parts and the edge of the cleaning machine opening is either less than four inches (10 cm), or less than 10% ~~percent~~ of the width of the opening.

**306.3** No change.

**306.4 ECS Alternative:** An owner and/or operator is allowed to meet the requirements of any one or combination of ~~subsections~~ Sections 306.1(b), 306.1(c), 306.2, and/or 306.3 of this rule by operating an ECS that controls VOC vapor from processes addressed by the requirement(s). ~~; such~~ Such ECS shall be operated in accordance with ~~subsection~~ Section IV of the Appendix within this rule.

**307 SPECIAL NON-VAPOR CLEANING SITUATIONS:**

**307.1 Blasting/Misting With Conforming Solvent:** No change.

**307.2 Blasting/Misting With Non-Conforming Solvent:** Any person shall use a Sealed System pursuant to ~~subsection~~ Section 304.3 of this rule for all blasting or misting with a non-conforming solvent.

**307.3 High Pressure Flushing:** No change.

**307.4 ECS Alternative:** ~~A person~~ An owner and/or operator is allowed to meet the requirement(s) of ~~subsection~~ Section 307.1 and/or ~~subsection~~ Section 307.2 of this rule by operating an ECS that controls VOC vapor from processes addressed by the requirement(s). ~~; the~~ The ECS shall be operated pursuant to ~~subsection~~ Section IV of the Appendix within this rule.

**308 EXEMPTIONS:**

**308.1 Categorical Exemptions:**

**a.** Industries and cleaning operations that are not regulated by this rule include, but are not limited to, the following EPA approved versions of the VOC rules in Regulation III~~:~~ of these rules:

**(1)** Dry cleaning with petroleum solvents (Rule 333);

**(2)** Printing and graphic arts coating (Rule 337);

**(3)** Semiconductor manufacturing (Rule 338);

~~(4) Vehicle refinishing (Rule 345);~~

~~(5)~~ **(4)** Automotive windshield washer fluid (Rule 344); and

~~(6)~~ **(5)** Architectural Coating (Rule 335).

**b.** All operations regulated by the following NESHAPs are exempt from Rule 331:

**(1)** National Emission Standards for Halogenated Solvent Cleaning (40 CFR 63, subpart T). This includes the de minimis amounts of solvent VOCs that are exempted by subpart T.

**(2)** National Emission Standards for Perchloroethylene for Dry Cleaning Facilities~~,~~ (40 CFR 63, ~~Subpart~~ subpart M).

**c. Exemptions For Qualified Operations:**

**(1)** **Cleanup Of Coating-Application Equipment:** Operations involving the cleanup of coating-application equipment that are ~~regulated by another rule~~ subject to or specifically exempted by an EPA approved version of another rule in Regulation III of these rules are exempt from Rule 331. Examples include Rule 336 (Surface Coating Operations), ~~and~~ Rule~~s~~ 342 (Coating Wood Furniture And Fixtures), and Rule 346 (Wood Coating).

**(2)** **Aerospace:** Wipe cleaning of aerospace components is subject to Rule 348 of these rules, whereas the cleaning of aerospace components in a dip tank~~,~~ or a cleaning machine~~, or by a flush cleaning process,~~ is subject to Rule 331.

**308.2 Partial Exemption From Section 300:** The following are exempt from sections of Section 300 of this rule as noted:

**a.** **Wipe Cleaning:** The provisions of Sections 302 through 307 of this rule do not apply to wipe cleaning. Recordkeeping provisions in Section 500 of this rule do apply to wipe cleaning.

**b.** **Small Cleaners:** The provisions of Sections 303 through 307 of this rule shall not apply to any non-vapor cleaning machine (degreaser) or dip-tank fitting either of the following descriptions, except that these shall be covered when work is not being processed:

**(1)** A small cleaner having a liquid surface area of 1 square foot (0.09 square meters) or less, or

**(2)** A small cleaner having a maximum capacity of one gallon (3.79 liters) or less.

**308.3** **Exemptions From Section 304:** No change.

**308.4** **Comfort Fans:** The ~~subsection~~ Section 303.1(a) prohibition against fans and fan-drafts being close to cleaning machines does not apply to a totally enclosed cleaning machine that cannot be penetrated by drafts.

**308.5** **Vehicle Refinishing:** Dip cleaning of vehicle or mobile equipment surfaces is subject to this rule.

**308.6** Aerosol cans, squirt bottles, and other solvent containers intended for handheld use shall meet the requirements in Sections 301 and 500 of this rule.

**308.7** A Low-VOC Cleaner is subject only to Sections 301, 302, 307.1, 501.1(a), and 501.2 of this rule.

**309 REQUIREMENTS FOR AIR POLLUTION CONTROL EQUIPMENT AND ECS MONITORING EQUIPMENT:** For the purpose of this rule, an ECS shall be approved in writing by the Control Officer and shall be designed and operated in accordance with good engineering practices.

**309.1 Operation And Maintenance (O&M) Plan Required For ECS:**

**a.** **General Requirements:** An owner ~~or~~ and/or operator shall provide and maintain (an) O&M Plan(s) for any ECS, any other emission processing equipment, and any ECS monitoring devices that are used pursuant to this rule or pursuant to an air pollution control permit. An owner and/or operator shall comply with all the identified actions and schedules provided in each O&M Plan.

**b.** **Approval By Control Officer Of Initial O&M Plan(s):** ~~The~~ An owner ~~or~~ and/or operator shall submit to the Control Officer for written approval the O&M ~~Plan~~ Plan(s) of each ECS and each ECS monitoring device that is used pursuant to this ~~Rule 331~~ rule. While the Control Officer is reviewing for approval the O&M Plan(s), an owner and/or operator shall compy with all the identified actions and schedules provided in each O&M Plan submitted for approval, unless notified otherwise by the Control Officer. After the Control Officer has issued

written approval of the O&M Plan(s), an owner and/or operator shall continue to comply with all the identified actions and schedules provided in each O&M Plan.

**c.** ~~The owner or operator shall comply with all the identified actions and schedules provided in each O&M Plan.~~ **Owner And/Or Operator Revisions To Intiail O&M Plan(s):** If an owner and/or operator submits to the Control Officer revisions to the initial O&M Plan(s) and if such revisions have been approved in writing by the Control Officer, an owner and/or operator shall comply with the revisions to the initial O&M Plan(s).

**d.** **Control Officer Modifications To Initial O&M Plan(s):** After discussion with the owner and/or operator, the Control Officer may modify the O&M Plan(s) in writing prior to approval of the initial O&M Plan(s). An owner and/or operator shall then comply with the O&M Plan(s) that has been modified by the Control Officer.

**309.2 Providing And Maintaining ECS Monitoring Devices:** ~~Any person~~ An owner and/or operator incinerating, adsorbing, or otherwise processing VOC emissions pursuant to this rule shall provide, properly install and maintain in calibration, in good working order and in operation, devices described in the facility's O&M Plan that indicate temperatures, pressures, rates of flow, or other operating conditions necessary to determine if air pollution control equipment is functioning properly and is properly maintained.

~~309.3 O&M Plan Responsibility: An owner or operator of a facility that is required to have an O&M Plan pursuant to subsection 309.1 must fully comply with all O&M Plans that the owner or operator has submitted for approval, but which have not yet been approved, unless notified otherwise by the Control Officer in writing.~~

**SECTION 400 - ADMINISTRATIVE REQUIREMENTS (NOT APPLICABLE)**

~~401 DATE OF EFFECT: By September 1, 1999, signage required by subsection 303.2 shall be complete and in place. By the same date, an owner or operator shall notify the Control Officer in writing of the intention to use an Emission Control System (ECS) as the means of meeting new provisions of this rule revision. Such an ECS shall be in use by May 1, 2000.~~

**SECTION 500 - MONITORING AND RECORDS**

**501 RECORDKEEPING AND REPORTING:** Any person subject to this rule shall comply with the following requirements. Records shall be retained for five years and shall be made available to the Control Officer upon request.

**501.1 Current List:**

**a.** Maintain a current list of cleaning-solvents; state the VOC-content of each in pounds VOC per gallon of material or grams per liter of material.

**b.** A facility using any cleaning-solvent subject to the vapor-pressure limits of ~~subsection~~ Section 304.1 of this rule shall have on site the written value of the total VOC vapor-pressure of each such solvent ~~by November 1, 1999~~, in one of the following forms:

**(1)** A manufacturer's technical data sheet,

**(2)** A manufacturer's safety data sheet (MSDS), or

**(3)** Actual test results.

**501.2 Usage Records:**

**a.** **Monthly:** Records of the amount of cleaning-solvent used shall be updated by the end of month for the previous month. Show the type and amount of each make-up and all other cleaning-solvent to which this rule is applicable.

**b.** **Annually:**

**(1)** **Certain Concentrates:** Use of concentrate that is used only in the formulation of Low VOC Cleaner shall be updated at least annually.

**(2)** **Low-VOC Cleaner:** An owner ~~or~~ and/or operator need not keep a record of a cleaning substance that is made by diluting a concentrate with water or non-precursor compound(s) to a level that qualifies as a Low VOC Cleaner if records of the concentrate usage are kept in accordance with this rule.

**c.** **Grouping By VOC Content:** For purposes of recording usage, an operator may give cleaning-solvents of similar VOC content a single group-name, distinct from any product names in the group. The total usage of all the products in that group ~~are~~ is then recorded under just one name. (In such a case, the operator must also keep a separate list that identifies the product names of the particular solvents included under the group name). To the group name shall be assigned the highest VOC content among the members of that group, rounded to the nearest 10th of a pound of VOC per gallon of material, or to the nearest gram VOC per liter of material.

**502 COMPLIANCE DETERMINATION AND TEST METHODS:** When more than one test method is permitted for a determination, an exceedance of the limits established in

the rule determined by any of the applicable test methods constitutes a violation of this rule.

**502.1 Compliance Determination:** The following means shall be used to determine compliance with this rule. For routine information collection, the Control Officer may accept a manufacturers' data sheet, data certified by an officer of the supplying company, or test data for the product model of inquiry.

**a. VOC Content:** The VOC content of solutions, dispersions, emulsions, and conforming solvents (reference Section 207 of this rule) shall be determined by one of the following methods:

**(1)** South Coast Air Quality Management District Method 313-91 as referenced in ~~subsection~~ Section 502.2(f) of this rule; or

**(2)** Bay Area Air Quality Management District Method 31 as referenced in ~~subsection~~ Section 502.2(e) of this rule; or

**(3)** Solids-free windshield washer solutions, in which all organic components are VOCs, may be tested using Maricopa County Reference Method #100, "Total Organic Carbon for Windshield Washer Fluids," Maricopa County Air Pollution Control Rule 344 (April 7, 1999). This method should only be used for water-based solutions containing less than 5% VOC by weight.

**b. Vapor Pressure:** Pursuant to Sections 304 and 207 of this rule, determination of the total VOC vapor-pressure (VOC composite partial-pressure) in a cleaning solution shall be performed as follows:

**(1)** For solutions known to be nearly or exactly 100% ~~percent~~ VOC, vapor pressure shall be determined by ~~ASTM D2879-92~~ ASTM D2879-96 as referenced in ~~subsection~~ Section 502.2(g) of this rule; or

**(2)** For solutions for which is known the exact quantity and chemical makeup of each evaporating component that is not a VOC, ~~ASTM D2879-92~~ ASTM D2879-96 (referencing ~~subsection~~ Section 502.2(g) of this rule) shall be used (to determine the gross composite vapor pressure) in conjunction with calculations using the vapor-pressure formula in ~~subsection~~ Section 502.3 of this rule.

**(3)** When a solution's exact species and proportions are known for all ingredients, the Control Officer may use the formula in ~~subsection~~ Section 502.3 of this rule in conjunction with

standard reference texts or data-bases that provide the vapor pressure value of each constituent, or a combination of formula use and actual testing on real constituents (referencing ~~subsection~~ Section 502.2(g) of this rule).

**c. ECS Compliance:**

**(1)** The VOC content of gaseous emissions entering and exiting an ECS shall be determined by either EPA Method 18 referred to in ~~subsection~~ Section 502.2(b) of this rule, or EPA ~~Method~~ Methods 25 ~~or its submethod~~, 25a, and 25b referred to in ~~subsection~~ Section 502.2(c) of this rule.

**(2)** Capture efficiency of an emission control device used pursuant to ~~Section 304~~ Section 304.2, ~~subsection~~ Section 305.4, ~~subsection~~ Section 306.4, and/or ~~subsection~~ Section 307.4 of this rule shall be determined either by the methods in Section 502.2(d) of this rule (EPA ~~Method~~ Methods ~~and its submethods,~~ 204, 204a, 204b, 204c, 204d, 204e, and 204f) or by using mass balance calculation methods in concert with the methods in Section 502.2(a) of this rule (EPA Methods 2, 2a, 2c, and 2d), and EPA guidance document, "Guidelines For Determining Capture Efficiency", January 9, 1995.

**d. Temperature Measurement:** Temperature measurements made pursuant to Section 214 of this rule to determine if a cleaning machine contains a "heated solvent" shall be done with an instrument having an accuracy and precision of no less than 1 degree Fahrenheit.

**502.2 Test Methods Adopted By Reference:** The EPA test methods as they exist in the Code of Federal Regulations (CFR) ~~(July 1, 1998)~~ (July 1, 2003), as listed below, are adopted by reference. The other test methods listed here are also adopted by reference, each having paired with it a specific date that identifies the particular version/revision of the method that is adopted by reference. These adoptions by reference include no future editions or amendments. Copies of test methods referenced in this Section 502 are available at the Maricopa County Environmental Services Department, 1001 North Central Avenue, Phoenix, AZ, 85004-1942.

**a.** EPA Methods 2 ("Determination of Stack Gas Velocity and Volumetric Flow Rate"), 2a ("Direct Measurement of Gas Volume Through Pipes and Small Ducts"), 2c ("Determination of Stack Gas Velocity and Volumetric Flow rate in Small Stacks or Ducts"), and 2d

("Measurement of Gas volumetric Flow Rates in Small Pipes and Ducts"). All 4 of the foregoing methods are in 40 CFR 60, Appendix A.

**b.** EPA Method 18 ("Measurement of Gaseous Organic Compound Emissions by Gas Chromatography") ~~and its submethods~~ (40 CFR 60, Appendix A).

**c.** EPA ~~Method~~ Methods 25 ("Determination of Total Gaseous Nonmethane Organic Emissions as Carbon") ~~and its submethods~~ ,25a, and 25b (40 CFR 60, Appendix A).

**d.** EPA Test Methods 204 ("Criteria For and Verification Of a Permanent or Temporary Total Enclosure"), 204a, 204b, 204c, 204d, 204e, and 204f ~~(Appendix M, 40 CFR 51).~~ (40 CFR 51, Appendix M) and EPA guidance document, "Guidelines For Determining Capture Efficiency", January 9, 1995.

**e.** California's Bay Area Air Quality Management District (BAAQMD) Method 31 (April 15, 1992), "Determination of Volatile Organic Compounds in Paint Strippers, Solvent Cleaners, and Low Solids Coatings."

**f.** California's South Coast Air Quality Management District (SCAQMD) Method 313-91 (April 1997).

**g.** American Society for Testing and Materials (ASTM) Method ~~D2879-92 (1992)~~ D2879-96 (1996).

**h.** EPA guidance document, "Guidelines For Determining Capture Efficiency", January 9, 1995.

**502.3 FORMULA FOR VOC COMPOSITE PARTIAL PRESSURE:** Equivalent to: **TOTAL VOC VAPOR-PRESSURE.**

$$PP_c = \frac{\sum_{i=1}^{n} (W_i)(VP_i)/M_i}{\frac{W_w}{18} + \sum_{j=1}^{m} \frac{W_e}{M_e} + \sum_{i=1}^{n} \frac{W_i}{M_i}}$$

$W_i$ = Weight of the "i"th VOC compound in grams

$W_w$ = Weight of water in grams

~~$W_{ej}$~~ = ~~Weight of the "j"th non-precursor compound in grams~~

$We$ = Weight of the "j"th non-precursor compound in grams

~~$MW_i$ = Molecular weight of the "i"th VOC compound in grams per gram mole,~~

~~e.g., one gram-mole of isopropyl alcohol weighs 60 grams~~

$M_i$ = Molecular weight of the "i"th VOC compound in grams per gram mole,

e.g., one gram-mole of isopropyl alcohol weighs 60 grams

~~$MW_{ej}$ = Molecular weight of the "j"th non-precursor compound,~~

~~e.g., 1 gram-mole of acetone weighs 58 grams~~

$M_e$ = Molecular weight of the "j"th non-precursor compound,

e.g., 1 gram-mole of acetone weighs 58 grams

$PP_c$ = VOC composite partial pressure at 20°C in mm mercury (Hg)

$VP_i$ = Vapor pressure of the "i"th VOC compound at 20°C in mm Hg

18 = Weight of one gram-mole of water

**APPENDIX TO RULE 331**

**VAPOR CLEANING MACHINES and EMISSION CONTROL SYSTEMS**

**I. DEFINITIONS:** ~~(Appendix)~~

**(1) VAPOR LEVEL CONTROL SYSTEM –** No change.

**II. BATCH-LOADED VAPOR** ~~DEGREASING~~ **CLEANING MACHINES:** ~~No person shall operate a batch-loaded vapor cleaning machine unless the machine either meets National Emission Standards for Halogenated Solvent Cleaning (subpart T, Rule 370) as if the cleaning solvent in use were subject to subpart T Standards and the Standards are adjusted for the solvent's own boiling point, OR the machine is equipped with the following:~~

**(1)** No person shall operate a batch vapor cleaning machine, unless the machine meets National Emission Standards for Halogenated Solvent Cleaning (subpart T, Rule 370), as if the cleaning solvent in use were subject to subpart T standards.

**(2)** No person shall operate a batch vapor cleaning machine, unless the machine has a vapor/air interface Fahrenheit temperature no greater than 30% of the solvent's boiling point temperature or no greater than 40.0°F (4.4°C), whichever is lower.

**(3)** Sections II(1) and II(2) of this Appendix shall not apply, if a batch vapor cleaning machine is equipped with all of the following:

~~(1)~~ **(A)** Cover: An impermeable cover that is a sliding, rolling, fanning, or guillotine (bi-parting) type which is designed to easily open and close without disturbing the vapor zone ~~; and~~.

~~(2)~~ **(B)** A Vapor Level Control System ~~; and~~.

~~(3)~~ **(C)** Primary Condenser: A primary condenser that maintains an exit temperature not exceeding 85°F (29°C) or ~~be~~ is equipped pursuant to ~~subsection II(6)B~~ Section II(3)(F)(ii) of this Appendix ~~; and~~.

~~(4)~~ **(D)** Freeboard Ratio: A freeboard ratio that is greater than or equal to 0.75.

~~(5)~~ **(E)** Lip ~~Exhaust~~ Exhausts: Vapor cleaning machines with lip exhausts shall be controlled by an ECS.

~~(6)~~ **(F)** ~~Additional Controls~~ Refrigeration Or ECS: Batch~~-loaded~~ vapor cleaning machines having any of the following descriptors shall comply with ~~subsection II(6)A or II(6)B or II(6)C~~ Sections II(3)(F)(i), II(3)(F)(ii), or II(3)(f)(iii) of this Appendix:

- an evaporative surface area equal to or greater than ~~13 ft$^2$ (1.21 m$^2$)~~ 10.75 ft$^2$ (1.0 m$^2$); or
- installed or subject to major modification after November 1, 1999; or
- having average monthly VOC emissions exceeding 31 pounds VOC per square foot of solvent surface area:

~~A.~~ **(i)** A refrigerated freeboard chiller for which the chilled air blanket temperature in degrees Fahrenheit at the coldest point on the vertical axis through the horizontal center of the vapor/air interface either shall be no greater than 30% ~~percent~~ of the initial boiling point of the solvent in degrees Fahrenheit or no greater than 40.0°F (4.4°C); or

~~B.~~ **(ii)** A refrigerated condenser coil (in place of an unrefrigerated coil) having a minimum cooling capacity of 100% ~~percent~~ of the boiling-sump heat input rate and conforming to the air blanket temperature requirements pursuant to ~~foregoing subsection II(6)A~~ Section II(3)(F)(i); or

~~C.~~ **(iii)** An ~~Emission Control System (~~ECS~~)~~ operated in accordance with ~~subsection~~ Section IV of this Appendix.

~~(7)~~ **(G)** ~~Workloads:~~ Water Separator: Water should not be visually detectable in the VOC containing solvent exiting the water separator.

**(4)** Sections II(1) and II(2) of this Appendix shall not apply, if a batch vapor cleaning machine meets all of the following:

**(A)** Workloads: ~~A workload shall not occupy more than half of the cleaning machine's open-top area.~~

~~B.~~ **(i)** ~~The workload shall not be so massive that the vapor level drops more than four inches (10 cm) when the workload is removed from the vapor zone.~~ A workload shall not occupy more than half of the cleaning machine's open-top area.

~~C.~~ **(ii)** ~~Do not spray cleaning solvent above the vapor/air interface level.~~ The workload shall not be so massive that the vapor level drops more than 4 inches (10 cm), when the workload is removed from the vapor zone.

**(iii)** The workload shall not be sprayed with cleaning-solvent above the vapor/air interface level.

~~(8)~~ **(B)** ~~Prevent~~ Carry-Out: Minimize cleaning-solvent carry-out by the following measures:

~~A.~~ **(i)** Orient the items being cleaned in such a way that the items drain easily after cleaning.

~~B.~~ **(ii)** Degrease the workload in the vapor zone at least 30 seconds or until condensation ceases.

~~C.~~ **(iii)** For manual loading/unloading, tip out any pools of solvent on the cleaned parts before removal.

~~D.~~ **(iv)** Allow parts to dry within the batch vapor cleaning machine until visually dry.

~~(9)~~ **~~(C)~~** ~~Starting And Stopping:~~ Startup And Shutdown: The following sequence shall be used for ~~start-up and shut-down~~ startup and shutdown:

~~A.~~ **(i)** When starting the ~~cleaning machine/cleaner~~ batch vapor cleaning machine, the cooling system shall be turned on before, or simultaneously with, the sump heater.

~~B.~~ **(ii)** When shutting down the batch vapor cleaning machine, the sump heater shall be turned off before, or simultaneously with, the cooling system.

~~(10)~~ **~~(D)~~** ~~Water should not be visually detectable in the VOC-containing solvent exiting the water separator.~~ Blasting: Blasting in a batch vapor cleaning machine shall be done within a Sealed System or be controlled by an ECS.

~~(11)~~ **~~(E)~~** ~~Blasting in a vapor cleaning machine shall be done within a Sealed System or be controlled by an ECS.~~ Records: An owner and/or operator operating a batch vapor cleaning machine shall keep records pursuant to Section 501 of this rule.

~~(12) An owner or operator operating a vapor cleaning machine shall keep records pursuant to Section 501 of this rule.~~

**III. IN-LINE VAPOR ~~DEGREASING~~ CLEANING MACHINES:** ~~No person shall operate an in-line vapor cleaning machine (degreaser) unless the machine either complies with the National Emission Standards for Halogenated Solvent Cleaning (subpart T, Rule 370) adjusted to the applicable solvent boiling point, OR the machine complies with subsections III(1) through III(5) of this Appendix.~~

**(1)** ~~Reduce VOC Loss:~~ No person shall operate an in-line vapor cleaning machine, unless the machine meets National Emission Standards for Halogenated Solvent Cleaning (subpart T, Rule 370), as if the cleaning-solvent in use were subject to subpart T standards.

~~A.~~ **(2)** ~~Prevent Carry-Out: Equip the cleaning machine (degreaser) with either a drying tunnel or another means, such as a rotating basket, sufficient to prevent cleaned parts from carrying out cleaning solvent liquid or vapor.~~ No person shall operate an in-line vapor cleaning machine, unless the machine has a vapor/air interface Fahrenheit temperature no greater than 30% of the solvent's boiling point temperature or no greater than 40.0°F (4.4°C), whichever is lower.

~~B.~~ **(3)** ~~Within 10 minutes of turning off the solvent heating system, cover the entrance and exit and any opening greater than 16 square inches (104 $cm^2$).~~ Sections III(1) and III(2) of this Appendix shall not apply, if an in-line vapor cleaning machine is equipped with all of the following:

~~(2)~~ **~~(A)~~** ~~Minimize Openings: Entrances and exits should silhouette workloads so that the average clearance between parts and the edge of the cleaning machine~~

~~(degreaser) opening is either less than four inches (10 cm) or less than 10 percent of the width of the opening.~~ Cover: Within 10 minutes of turning off the solvent heating system, cover the entrance and exit and any opening greater than 16 square inches (104 $cm^2$).

**(B)** Vapor Level Control System.

~~(3)~~ **(C)** ~~Use a vapor level control system.~~ Primary Condenser: Have a primary condenser that maintains an exit temperature not exceeding 85°F (29°C).

~~(4) Have a freeboard ratio greater than or equal to 0.75.~~

~~(5) Have a primary condenser that maintains an exit temperature not exceeding 85°F (29°F); or be equipped pursuant to subsection II(6)(B).~~

~~(6)~~ **(D)** ~~Meet the requirements of subsection II(6)(A), or subsection II(6)(B), or subsection II(6)(C) of this Appendix.~~ Freeboard Ratio: Have a freeboard ratio greater than or equal to 0.75.

~~(7)~~ **(E)** ~~Meet the requirements of subsections II(9) and II(10) of this Appendix.~~ Refrigeration Or ECS: In-line vapor cleaning machines having any of the following descriptors shall comply with Sections III(3)(E)(i), III(3)(E)(ii), or III(3)(E)(iii) of this Appendix:

- an evaporative surface area equal to or greater than 10.75 $ft^2$ (1.0 $m^2$); or
- installed or subject to major modification after November 1, 1999, or
- having average monthly VOC emissions exceeding 31 pounds VOC per square foot of solvent surface area:

~~(8)~~ **(i)** ~~An owner or operator operating a vapor cleaning machine shall keep records pursuant to Section 501 of this rule.~~ A refrigerated freeboard chiller for which the chilled air blanket temperature in degrees Fahrenheit at the coldest point on the vertical axis through the horizontal center of the vapor/air interface either shall be no greater than 30% of the initial boiling point of the solvent in degrees Fahrenheit or no greater than 40.0°F (4.4°C); or

**(ii)** A refrigerated condenser coil (in place of an unrefrigerated coil) having a minimum cooling capacity of 100% of the boiling-sump heat input rate and conforming to the air blanket temperature requirements pursuant to Section III(3)(E)(i) of this Appendix; or

**(iii)** An ECS operated in accordance with Section IV of this Appendix.

**(F)** Water Separator: Water should not be visually detectable in the VOC-containing solvent exiting the water separator.

**(4)** Sections III(1) and III(2) of this Appendix shall not apply, if the in-line vapor cleaning machine meets all of the following:

**(A)** Workloads: Entrances and exits should silhouette workloads so that the average clearance between parts and the edge of the in-line vapor cleaning machine opening is either less than 4 inches (10 cm) or less than 10% of the width of the opening.

**(B)** Carry-Out: Equip the in-line vapor cleaning machine with either a drying tunnel or another means, such as a rotating basket, sufficient to prevent cleaned parts from carrying out cleaning-solvent liquid or vapor.

**(C)** Startup And Shutdown: The following sequences shall be used for startup and shutdown:

**(i)** When starting the in-line vapor cleaning machine, the cooling system shall be turned on before, or simultaneously with, the sump heater.

**(ii)** When shutting down the in-line vapor cleaning machine, the sump heater shall be turned off before, or simultaneously with, the cooling system.

**(D)** Records: An owner and/or operator operating an in-line vapor cleaning machine shall keep records pursuant to Section 501 of this rule.

## IV. EMISSION CONTROL SYSTEM REQUIREMENTS:

**(1)** An Emission Control System (ECS) used pursuant to this rule shall consist of a hood or enclosure to collect emissions, which are vented to a processing device. The overall control efficiency (capture plus processing) of the system shall not be less than 85% ~~percent~~. The capture system shall have a ventilation rate no greater than 65 cfm per square foot of evaporative surface (20 $m^3$/min./$m^2$), unless that rate must be changed to meet a standard specified and certified by a Certified Safety Professional, a Certified Industrial Hygienist, or a licensed professional engineer experienced in ventilation-system design, that concerns health and safety requirements. The ECS shall be approved by the Control Officer.

**(2)** **Operation And Maintenance (O&M) Plan Required For ECS:** An owner ~~or~~ and/or operator shall create and maintain an ~~Operation and Maintenance~~ O&M Plan for any ECS required by this ~~Rule 331~~ rule or pursuant to an air pollution control permit in accordance with Section 309 of this rule.

**(3)** **Recordkeeping:**

**(A)** **ECS Operation And Maintenance Records:** On each day that an ECS is used to comply with any provision of this rule, an owner ~~or~~ and/or operator shall make a permanent record of the operating parameters of the key systems described in the O&M Plan. For each day or period in which the O&M Plan requires that maintenance be performed, a permanent record shall be made of the maintenance actions taken, within 24 hours of maintenance completion. An

explanation shall be entered for scheduled maintenance that is not performed during the period designated in the O&M Plan.

**(B)** **Other Records Required When Complying Via ECS:** An owner ~~or~~ and/or operator using an ECS pursuant to this rule shall maintain, in addition to the records required by ~~subsection~~ Section 501.1 of this rule, daily documentation showing the VOC content of the solvent material and the amount added for makeup.

**(4)** **Test Methods For Determining Emission Control System Compliance:** Test methods and compliance procedures for an ECS are in Section 502 of this rule.